Treatment Step Options for Androscoggin River Point Sources.

Option	Treatment Technologies	Est capital cost. Cost	EST O&M cost/YEAR
0.0 Operrate at BPT limit	Activate sludge	$0	$3,000,000
	TOTAL		$3,000,000
1. No changes to point source Waste Discharge Licenses. Continue operation of GIPOP.	Activate sludge	$0	4100000
BOD TSS TP	GIPOP 1*		
13400 28200 164			
	TOTAL		4100000
1a. No changes to point source Waste Discharge Licenses. Continue operation of GIPOP and GIPOP2.			
BOD TSS TP	Activate sludge		4100000
13400 28200 164	GIPOP 1& GIPOP 2*		
	TOTAL	0	4100000
2. Reduce BOD/TSS of point source Waste Discharge Licenses to current levels. Continue operation of GIPOP	EXISTING (presently near licence limits)		
BOD TSS TP	Add additional aeration	800,000	25,000
10200 11000 164	GIPOP 1*		
	improved secondary clarifification	300000	130,000
	Floating media reactor system at paper mill**	15000000	1,500,000
	present activated sludge		3500000
	TOTAL	16,100,000	5,155,000
3.. Reduce BOD/TSS of point source Waste Discharge Licenses to model levels. Reduce modeled point source phosphourous by 1/6	EXISTING (presently near licence limits)		
BOD TSS TP	Add additional aeration	800,000	25,000
10200 11000 148	Improved engineering controls on phosphorus***		
	Improved secondary clarification	300000	130,000
	Floating media reactor system at paper mill**	15000000	1,500,000
	Present activated sludge		4100000
	TOTAL	16,100,000	5,755,000
3A. Reduce BOD/TSS of point source Waste Discharge Licenses to model levels. Reduce modeled point source phosphorous by 1/3	EXISTING (presently near license limits)		
BOD TSS TP	Add additional aeration	800,000	25,000
10200 11000 148	Improved engineering controls on phosphorus***		
	Improved secondary clarification	300000	130,000

				Floating media reactor system at paper mill**	15000000	1,500,000
				Present activated sludge		4100000
				TOTAL	16,100,000	5,755,000
4a. Reduce BOD/TSS of point source Waste Discharge Licenses to model levels. Reduce point source phosphorus by 1/3. Continue operation of GIPOP.				EXISTING (presently near license limits)		
BOD	TSS	TP		Add additional aeration	800,000	25,000
11000	20000	99		Improved engineering controls on phosphorus***		
				Improved secondary clarification	400000	130,000
				Floating media reactor system at paper mill**	15000000	1,500,000
				Present activated sludge		4100000
				GIPOP 1*		
				TOTAL	16,200,000	5,755,000
4b. Reduce BOD/TSS of point source Waste Discharge Licenses to model levels. Reduce point source phosphorus by 1/3. Continue operation of GIPOP1 add GIPOP2.				EXISTING (presently near license limits)		
BOD	TSS	TP		Add additional aeration	800,000	25,000
11000	20000	99		Improved engineering controls on phosphorus***		
				Improved secondary clarification	400000	130,000
				Floating media reactor system at paper mill**	15000000	1,500,000
				Present activated sludge		4100000
				GIPOP 1& GIPOP 2*		
				TOTAL	16,200,000	5,755,000
5. Reduce BOD/TSS of point source Waste Discharge Licenses to model levels. Reduce point source phosphorus by 50%. Continue operation of GIPOP.				EXISTING (presently near license limits)		
BOD	TSS	TP		Add additional aeration	800,000	25,000
10200	11000	74		Improved engineering controls on phosphorus		
				Tertiary treatment with polymer		
				Floating media reactor system at paper mill**	15000000	1,500,000
				Present activated sludge		4100000
				GIPOP 1*		
				TOTAL	15,800,000	5,625,000
6. Reduce BOD/TSS of point source Waste Discharge Licenses to model levels. Reduce point source phosphorus by 67%. Continue operation of GIPOP.				EXISTING (presently near license limits)		
BOD	TSS	TP		Add additional aeration	800,000	25,000
10200	11000	49		Improved engineering controls on phosphorus***		
				Tertiary treatment with polymer & chemical precip***		
				Floating media reactor system at paper mill**	15000000	1,500,000
				Present activated sludge		4100000
				GIPOP 1*		

			TOTAL	15,800,000	5,625,000
7. Reduce BOD/TSS of point source Waste Discharge Licenses to model levels. Reduce point source phosphorus by 40%. Continue operation of GIPOP1 add GIPOP2.			EXISTING (presently near license limits)		
BOD	TSS	TP	Add additional aeration	800,000	25,000
10200	11000	89	Improved engineering controls on phosphorus***		
			Tertiary treatment with polymer***		
			Floating media reactor system at paper mill**	15000000	1,500,000
			Present activated sludge		4100000
			GIPOP 1& GIPOP 2*		
			TOTAL	15,800,000	5,625,000
8. Reduce BOD/TSS of point source Waste Discharge Licenses to model levels. Reduce point source phosphorus by 1/3. Continue operation of GIPOP& add GIPOP2.			EXISTING (presently near license limits)		
BOD	TSS	TP	Add additional aeration	800,000	25,000
10200	11000	99	Improved engineering controls on phosphorus***		
			Improved secondary clarification	400000	130,000
			Floating media reactor system at paper mill**	15000000	1,500,000
			Present activated sludge		4100000
			GIPOP 1& GIPOP 2*		
			TOTAL	16,200,000	5,755,000
9. Reduce BOD/TSS of point source Waste Discharge Licenses to model levels. Reduce point source phosphorus by 40%. Continue operation of GIPOP& add GIPOP2.			EXISTING (presently near license limits)		
BOD	TSS	TP	Add additional aeration	800,000	25,000
10200	11000	89	Improved engineering controls on phosphorus***		
			Tertiary treatment with polymer***		
			Floating media reactor system at paper mill**	15000000	1,500,000
			Present activated sludge		4100000
			GIPOP 1& GIPOP 2		
			TOTAL	15,800,000	5,625,000
10. Zero discharge from mill - mill would not be viable			Reverse osmosis (industrial kidney) technology	approx 500,000,000	40,000,000
				Mill shut down	360,000,000 removed from NH economy
11. Zero discharge from mill - mill would not be viable			Reverse osmosis (industrial kidney) technology	approx 500,000,000	40,000,000
				Mill shut down	360,000,000 removed from NH economy
11. Zero discharge from mill - mill would not be viable			Reverse osmosis (industrial kidney) technology	approx 500,000,000	40,000,000
				Mill shut down	360,000,000 removed from NH economy
13. No changes to point source Waste Discharge Licenses. Continue operation of GIPOP.			Activate sludge	$0	4100000
BOD	TSS	TP			

13400	28200	164			
			TOTAL		4100000
remove dam					

1 assume phosphorous at 2.8 ppm in discharge

* Cost associate with GIPOP 1 & GIPOP 2 submitted by partnership

**used cost figure from recent Madawaska secondary treatment project
*** phoshorous removal costs in Woodard & Curran Document
all cost are +/- 30%